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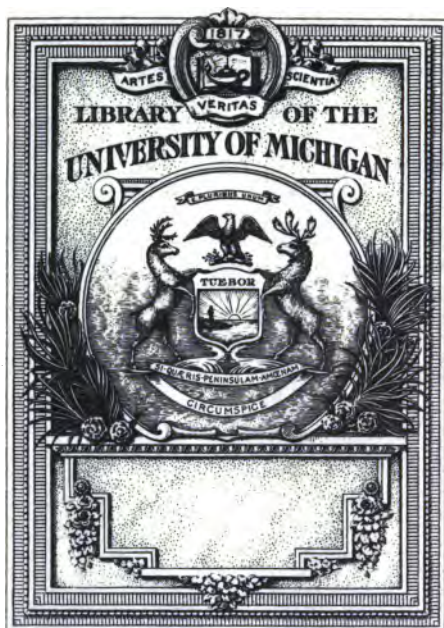
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International Fisheries Exhibition

LONDON, 1883

A SKETCH

OF THE

FISHERIES OF JAPAN

736

BY

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MEMBER OF THE JAPANESE CONSULATE IN LONDON

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International Fisheries Exhibition.
LONDON, 1883.

CONFERENCE ON TUESDAY, OCTOBER 23,
1883.

Mr. SONODA KOKICHI in the Chair.

THE CHAIRMAN, said it gives me much pleasure to introduce to you Mr. Okoshi, our lecturer, on this occasion. Before he proceeds to read his Paper, you will, perhaps allow me to make a few remarks. It was my intention to lay before you an official Paper in connection with the fishing industries of Japan. But I regret that, owing to the absence of any statistical information from my government on the subject, I have not been able to do so. My friend Mr. Okoshi, however, kindly undertook the task of preparing a Paper, which he will have the honour to read to you presently. But I must mention that, being left without such desirable information as I have stated, he has met with no small amount of difficulties. He has had to gather information from various semi-official sources, while he is not professionally connected with fishing industries. If you observe, therefore, any shortcomings in his treatment of the present subject, I desire you to attribute them to the circumstances under which he has had to labour. If you find, on the other hand, anything interesting or valuable in his Paper, it would be a source of great satisfaction to him as well as to myself.

THE FISHERIES OF JAPAN.

INTRODUCTION.

IT would be perhaps too audacious on my part to attempt to speak on this subject, which I have never made the particular object of my study, and with which I have never been connected, especially before such a select audience as this, and after many interesting Papers have been read by eminent specialists at this Conference. But at the same time, it would be a matter of great regret to lose this opportunity kindly afforded me, without showing you what deep interest Japan takes in this question, and what extensive fisheries she possesses. I am sorry to say, however, that for want of deeper knowledge, and of the materials which I could not obtain in London, I am not enabled to give you ample information upon Japanese fisheries, which embrace such a large field of investigation and require a great deal of experience. No doubt many things will be left to be desired, this I hope you will excuse. I shall try, nevertheless, to give you a general idea of our fisheries.

The geographical situation of Japan with respect to the continent of Asia is very similar to that of Great Britain to Europe. Our Empire consists of the mainland, Kiushiu, Shikoku, its northern provinces of Hokkaido or Yeso, the Kurile Islands, Okinawa, better known as Loo-choo, and the Bonnin archipelago in the south; it embraces an almost tropical zone of 24 degrees of latitude, and a glacial

zone of 51 degrees. This peculiar situation of our country affords us most extensive fishing-grounds, and its variety of climate produces in the Japanese sea almost every sort of fish imaginable; while in the interior, which is traversed by many rivers and brooks, and interspersed with lakes, fresh-water fish is also abundantly found. Either on account of our geographical position, or from some other cause, the chief food of our people has been, and is still, fish, which in Japan is eaten as meat is in this country. Although the use of flesh-food was introduced by foreign intercourse, yet it has not, and I think will not, take entirely the place of fish; far from such being the case, only the better class of people can afford to live on meat. Hence it appears to me that there is a great difference in this respect between the people of Japan and those of this country; the difference is, that in Japan even the poorer class of people can live on fish, while fish is chiefly a luxury for the better class of the English community. Therefore it is needless to say that Japan takes a great interest in this question of fisheries, though it is a matter of regret that our section in the Exhibition is not so largely and well represented as might be desired.

I.—SEA-PRODUCE.

Our fishing-ground is estimated to contain over seven millions of cho, *i.e.* about eighteen millions of acres: compared to the cultivated land of about eleven millions of acres there is a difference of about seven millions of acres in favour of the sea; supposing one acre of land produces one ton of corn, a fishing-ground of the same extent should produce seventeen times as much, if it be properly worked. If such be really the case, Japan should produce tens of millions of tons of fish. Indeed, our fishing-ground not

only produces fish, properly so-called, crustaceans and molluscs, but it also abounds in salt, also several kinds of sea-weeds, which are largely taken by our fishermen and consumed most extensively in Japan. According to the returns from the Imperial Statistical Bureau for 1879, the quantity of our sea-products was as follows :

Salt fish	13,297,054 Kin.*
Dried fish	4,713,868 „
Salted Sardines	31,752,119 „
Total	<u>49,763,041 „</u>

Hence it must be about fifty millions of pounds' weight. Salt was produced in that year to the amount of 4,848,199 koku,† being about twenty-seven million bushels.

The above statistics are exclusive of the products of Yeso and the Loo-choo Islands. The following table shows the quantity of sea-products of Yeso for the year 1878 :

Salmon	69,149 Koku	{ Each con- taining 6,000 fish }	= 41,489,400 fish.
Masu (Spring Salmon)	12,471 „	12,000 „	= 14,965,200 „
Cod fish	11,296 „	6,000 „	= 6,810,600 „
Herrings	515,481 „		
Sardines	180,171 „		<u>63,265,200 „</u>
Sea-weeds	60,615 „		
Bêche de mer	12,293 „		
Total	<u>861,476 „</u>		

While I was writing this Paper, a most interesting statement, showing the statistics of our sea-produce by diagrams and map, was received by the Japanese Consulate from our Department of Commerce and Agriculture.

* One kin is equal to English lb. 1.32377.

† One koku is equal to about 5 bushels and half.

From this document, which has been specially prepared for the National Fisheries Exhibition held in Tokio this year, it appears that Japan and Yeso, excluding other dependencies, produced in 1881 :

Salt	910,331,833 Kin.
Dried fish	4,550,422 „
Salt fish	80,561,944 „
Dried Sardines	194,657,489 „
„ Sea-ear	976,684 „
„ Shrimps	3,373,999 „
Cuttle-fish	2,458,586 „
Bêche de mer	522,066 „
Colle Végétale	1,699,058 „

Exclusive of salt and sea-weed, the total quantity amounts in round numbers to two hundred and eighty seven millions. It must be borne in mind that in this enormous amount of sea-produce, fish which is consumed fresh, and also fresh-water fish, are not included. As to the latter kind of fish, as well as those used for manure, their quantity must be enormous, considering fish is more eaten when fresh than in any other state. It seems difficult everywhere to obtain accurate statistics of fish consumed fresh ; and there appears no return for it in Japan. If it could be ascertained, we should find that the quantity of fish we consume yearly is something fabulous. Take, for the sake of argument, the town of Tokio, containing about one million of souls, what will be the daily consumption of fish ? Supposing, for instance, that one-half of its inhabitants being too poor to buy fish (although this might not be the case), lives on rice and vegetables only, and the other half lives upon fish and rice ; supposing, again, each consumes half a pound of fresh fish every day, the daily consumption of fish in Tokio alone would be 25,000 lbs. We may infer from this what an enormous quantity of fish is supplied by the Japanese seas

and rivers in a year to feed thirty-six millions of people. The total value of our sea-products is estimated at about thirty millions of yen.

At first sight this vastness of our fish-products seems too astounding, and it might be doubted whether the above statement might not be an imaginary conclusion; but when we find what is the real fishing power of Japan, this doubt will vanish away at once.

II.—FISHING POWER.

We find in the official return* that the number of our fishermen (I presume that those who are employed in fishing, not being *bonâ fide* fishermen, also women and boys are included therein) is stated to be 1,530,795; fishing boats, 187,220; nets, 436,999. These 1,530,795 fishermen are distributed among 341,470 families, about five people on an average forming one family.

The number of British fishermen is estimated to be—

England	.	.	.	42,000
Scotland	.	.	.	48,000
Ireland	.	.	.	24,000
Total	.	.	.	114,000

and the tonnage of fish caught in British water at 550,000, each fisherman catching about five tons of fish every year. Now, supposing one third of 1,500,000 be *bonâ fide* fishermen, and each catches the same amount of fish as a British fisherman, they would catch 2,500,000 tons. I am sorry I am not enabled to state the economical condition of fishermen and the capital employed for fisheries in general, nor could

* This statement, extracted from official returns, is found in the *Keizaizâshi* (Japanese 'Economist') of June 9th, 1883.

I state the tonnage of the 187,220 fishing boats, without misleading the reader by rough calculation. However, the majority of those boats are Japanese junks, strongly built and not of very large dimensions, carrying from 5 to 12 persons; but some must be sailing boats of European build. This enormous amount of fish, shell-fish and sea-weeds captured by an army of fishermen, is for the most part consumed at home, but some is exported abroad.

III.—JAPANESE FOREIGN TRADE IN SEA-PRODUCE.

Our sea-products occupy one of the most important classes of our exports, and there is a prospect of great increase. The following figures show a remarkable development of this branch of industry.

EXTRACT FROM OUR IMPERIAL CUSTOMS RETURN.

Dried fish, sea-weeds, shells and fish oil, 14 different articles in all, exported to foreign countries.

Quantities.	Declared Values.
1871.—19,547,000 Cty.	1,133,000 Yen.
1876.—28,668,000 „	1,626,000 „
Increase, 9,121,000 Cty.	Increase, 493,000 Yen.
1881.—40,007,000 Cty.	2,415,000 „
Increase, 11,339,000 Cty.	Increase, 789,000 Yen.

It must be remarked that from 1871 to 1875, during 5 years, our exports in sea-products have increased about 46 per cent. ; and from 1876 to 1881 during 5 years, 39 per cent. in quantity ; and from 1871 to 1881, during 10 years, they have more than doubled, both in quantity and value.

EXPORT OF SEA-PRODUCTS TO FOREIGN COUNTRIES FOR THE YEAR 1880.

To	Cuttlefish.	Sea-weed.	Dried Sea-Ear.	Colle Végé- tale.	Bêche de Mer.	Shells of Sea-Ear.	Other Articles.	Total.
	Yen.	Yen.	Yen.	Yen.	Yen.	Yen.	Yen.	Yen.
China	647,761	696,735	261,799	286,838	234,015	5,608	207,423	2,340,179
England	..	..	..	2,575	..	99,464	3,238	105,277
France	..	..	..	910	..	2,525	5,760	9,195
America U.S.	621	6	957	578	..	6,723	1,669	10,554
India	5	..	3	856	..	..	..	864
Russia	..	1	..	..	..	..	749	750
Germany	..	..	..	..	..	..	12	12
Denmark	..	..	..	..	..	..	15	15
Australia	..	..	..	..	..	..	120	120
Holland	..	..	..	..	..	..	10	10
Italy	..	..	..	..	..	500	730	1,230
West Indies	..	..	..	..	..	..	33	33
Other Countries	..	..	..	..	..	..	19,958	19,964
Total	648,387	696,748	262,759	291,757	234,015	114,820	239,717	2,48,203

It will be seen from the above table that we exported to the value of 2,488,203 yen, and from this amount 2,349,199 yen were to meet the demand of China alone.

The following table shows our imports of sea-products from other countries for the same year :

	Tortoise Shells.	Corals.	Other Articles.	Total.
	Yen.	Yen.	Yen.	Yen.
China	6,479	626	35,805	44,910
England	6,855	..	5,863	12,718
France	412	..	1,318	1,730
America, U.S. . .	157	..	853	1,010
India	75,050	100	12,664	87,814
Russia	..	..	2,410	2,410
Germany	875	..	1,613	2,488
Australia	243	..	..	243
Holland	1,299	..	..	1,299
Italy	..	124,797	124	124,921
West Indies. . .	30,480	..	600	31,080
Other Countries .	13	..	3,695	3,708
Total	122,564	126,822	64,945	314,331

It must be pointed out that we require very little importation of foreign sea-products. From the above table it will be seen that tortoise-shell and coral form the largest amount of the imports, and naturally enough the former is largely imported from India, and the latter from Italy. These two articles are used in Japan chiefly for ladies' hair ornaments.

Let us see what was the state of our exports to China alone, in the following six principal sea-products for the last three years.

1880.	Quantity. Cty.	Value. Yen.
Dried Sea-ear	1,069,667	261,799
Dried Cuttle-fish	3,913,788	647,761
Bêche de mer	518,474	234,015
Colle Végétale	1,341,823	286,838
Sea-weeds	23,375,871	577,427
Do. cut	3,170,024	119,307
Total	33,388,857	2,127,147
1881.		
Dried Sea-ear	850,370	212,050
Do. Cuttle-fish	2,750,644	476,565
Bêche de mer	577,889	285,839
Colle Végétale	1,293,900	330,335
Sea-weeds	27,637,094	681,323
Do. cut	4,212,021	158,499
Total	37,422,018	2,344,611
1882.		
Dried Sea-ear	1,064,109	283,385
Do. Cuttle-fish	3,724,488	645,227
Bêche de mer	661,849	271,648
Colle Végétale	758,936	206,616
Sea-weeds	22,831,872	408,279
Do. cut	4,059,545	121,837
Total	32,100,799	1,936,992

IV.—FISH AND SHELL-FISH OF DIFFERENT KINDS FROM THOSE USUALLY EATEN IN ENGLAND.

Differences of the Japanese seas, and also differences of climate, may produce fish and shell-fish which are not seen in the English market, but which are consumed in Japan. Some perhaps may be caught in British seas, but are not used for eating purposes, as the taste and customs of the people are different. Again, the fish most *recherché* in Japan is not so in this country. The most common and largely consumed fish, called Maguro or tunny-fish, varying in size from 3 feet to 7 or 8 feet in length, is not seen in this country. Whether the British sea does not produce it, or it is not caught by fishermen, I do not know, but this fish is largely caught and consumed in my country. Although, I think, Octopus, Cuttle-fish, Sea-ears, and Bêche-de-mer may be found in British waters, they are not eaten in this country.

On the contrary, eating Cuttle-fish may be looked upon with horror by the people of London, while in Japan they are readily eaten. This point has been referred to by Mr. Henry Lee in his most elaborate paper entitled 'Sea Monsters Unmasked,' with illustrations of a Japanese fish-monger's shop, where a large cuttle-fish hangs down, with its feet touching the ground ; in every Japanese fish shop indeed, this ugly looking animal is exhibited, his head hanging on a hook. Its size varies according to its species and locality, but a very large one is never eaten ; it is generally eaten when from one foot to three feet in length in its normal state, that is to say, when it is uncooked, because once boiled, it shrinks to half its length, and gets stouter and

its skin becomes of a dark-red colour. Cuttle-fish is eaten fresh, dried, or salted, but is generally consumed fresh. Again, sea-ear and bêche de mer are largely consumed fresh, but a great amount of them is dried and used for exportation to China, and the shells of sea-ear are now exported to Europe for the manufacture of buttons and other purposes. There are many varieties of shell-fish, families of molluscs, including oysters, lobsters, crabs, &c., which are eaten.

Among sea fish, the most esteemed in Japan are sea-breems (*Chrysophrys major*), turbot and sole, and the family of tunny-fish called Katsuo, but smaller in size, varying from one to four feet in length. This last-named fish is most extensively taken, and consumed either fresh or dried. It is mostly caught in Shikoku; when dried, it may be kept for several years; it is this fish which is denominated in the statistics referred to before as dried fish (*Katsuobushi*), the quantity of which amounts to about five millions of caties every year.

As to fresh-water fish, carp, eels, sly-silurus (*Namazu*), and Ahyu of the smelt family are most *recherché*; while the consumption of eels which are caught either in the sea or in fresh water—fresh-water eels being preferred—must be something enormous, as in Tokio there are thousands of restaurants called Eel-houses, where this fish is principally served. Herrings and salmon are chiefly fished in Yezo, and dried or smoked on the spot, as the difficulty of transport to the capital prevents their being sent there fresh; hence, fresh salmon is very seldom seen in the market of Tokio. Sardines reach the capital fresh, and are consumed largely in that state; but not only are they sent dried, but they are also greatly used for manure.

As to the quantity of whales caught in Japanese water, I am unable to give a statement, for want of information;

not only is oil extracted from this fish, but its bones are used for different purposes ; and it is also eaten in Japan when dried, although in small quantities, its taste rather resembling meat than fish.

Glue and wax, as exhibited in our Court in the Fisheries Exhibition, are also made from the skin and intestines of different fish, through chemical process. Besides all these and other kinds of fish, different sorts of sea-weeds are very largely consumed as eatables in Japan.

It will be of peculiar interest to know that there exists in our country a sea-fish, called Fugu, belonging to the order of *Tetrodons*, which is generally known to be very poisonous. In some localities the sale of this fish is strictly prohibited ; but there are different kinds, some of which are said not to be poisonous. As this fish is of peculiarly pleasant taste, the lower class of people are often tempted to eat it. There is a proverb which says : "Fugu wa Kui tashi Inochi wa oshishi" ("Great is the temptation to eat Fugu, but greater is the dread of losing life"). This shows how agreeable its taste is, and how poisonous it is to those who eat it.

V.—MODE OF FISHING.

Fish are caught either by nets, lines or other gear, according to their nature and kind. Nets are a little different, according to the localities where fishing is pursued. I shall endeavour to give some idea of the cod-fish, bream, mackerel fishing, and that of some other fish.

Nets are seldom used for catching cod ; it is generally caught with lines. This fishery principally flourishes in the Northern sea, beginning from the 37th degree of latitude, therefore mostly on the coasts of the Island of Yeso, where generally five fishermen in a boat take with

them 50 or 60 stout lines made with hemp, each line being from 160 to 200 yards long. To each line about 50 branch lines are attached at the interval of every 5 feet, and at the end of these, hooks are fixed. Lead is attached to both ends of the lines, and 3 buoys are fixed to it. Sardines or herrings, fresh or salted, are used for bait. The cod-fishing season, though it varies according to localities, lasts generally from December to March. The time for fishing is generally from 6 A.M. to 3 P.M., but this varies, of course, according to weather and tide. In the north the average quantity of one day's fishing is about 460 cod-fish per boat. In the Eastern sea the mode is a little different; it is conducted by 3 or 4 men in a boat, and the average fish caught is no more than 70 or 80 a day. Northern fishermen appear to be more skilful, in spite of rough and often stormy seas. I must not omit to mention that cuttle-fish is generally used for a bait for cod-fish in the Eastern fisheries.

Sea-bream is generally caught by trawl-nets, but line-fishing is nevertheless employed to some extent. The line for sea-bream is generally 2100 yards in length, and at the distance of every 2 yards a branch line, 4 yards long, is attached with a hook at the end. It is thrown into the sea at sun-rise, with crabs or other molluscs for bait, and every 2 or 3 hours it is taken out.

As to the mackerel-fishing, it is pursued at night; a number of boats sail in the evening and anchor where it is likely mackerel would flock. The fishermen also attract them by the use of torches, and catch them by hand-lines, using for bait sardines, or some other small fresh fish.

The mode of catching the octopus is very curious. A long cord of several miles in length is laid at the bottom of the sea, and branch lines, one or two yards long, are attached

at intervals of 2 yards ; at the end of each line, old shells, or bamboo cut in the form of pots, are hung down. The octopus is generally attached to rocks or some other objects, in order to protect its soft head ; so that it finds these pots a very comfortable home, and gets inside and holds them strongly with its feet. Generally the cords are left for 6 or 7 days, and then they are taken up with pots-full of octopus, which, being of a very timid nature, stick closely in them, believing that they are in the safest place. In this manner the small kind of this fish is caught on the south and east coasts of Japan.

Tunny fish, and katsuo of the same family, are taken by rod and line. The boats for catching the latter kind of fish are generally strongly built, and manned by 8 or 10 men. When attracted by fresh sardines thrown into the sea by fishermen, they flock in great quantities, and then they are caught with artificial fish as bait. It is said that this fish is so easily and extensively caught, that young fishermen even forget that the boat would sink from being overladen with several tons of fish ; there is therefore one old patron on board. When he thinks enough has been taken, he gives the order to his younger fellows to stop. Whale-fishing is performed with harpoons by numerous fishermen in several boats, pursuing the animal several miles off the coast. This mode of taking them seems to be general in the Japanese sea ; but in Kagoshima, they pursue it into the bay, and then capture it with nets.

I am enabled to give the above statement concerning octopus and katsuo fishing, owing to the information kindly furnished me by Mr. K. Nabeshima, a student in London, who not only lived among the fisherfolk of Hizen, but is also himself a great fisherman.

As to the practice of throwing nets, which are known in

Japan by the name of *To-A mi* and which, are very largely used either in sea or fresh-water fishing, I leave it to be explained by a most elaborately prepared note kindly furnished by Mr. K. Nabeshima, and which will be found in the Appendix. It may be worth mentioning that there exists in the eastern and southern coasts of Japan a class of women-divers, whose calling is to catch sea-weeds and shell-fish, especially sea-ear. Those who are familiar with Japanese pictures cannot help being struck with those representing beautiful women with red bathing-dresses, some diving into the rough sea and others coming out from the water, holding some shell-fish in their hands. But the women-divers actually engaged may not have such a mermaid-like beauty as represented in the pictures. However, their bravery and skill are very well known in Japan.

Those who have travelled in the interior, especially in Tokaido, may no doubt have remarked these divers; it is sometimes very amusing and refreshing after a fatiguing journey, to pass a couple of hours at the place where we alight on the sea-coast, looking at the divers, who will catch you shell-fish if you give them some recompense. At first, travellers are very much struck with the skill of these divers, who, according to the reward promised, bring shell-fish of different sizes. But they may discover afterwards that the divers had collected different sizes of shell-fish beforehand, and know very well what kind of these to choose, according to the amount of reward they should receive. Though this is only for the pleasure of curious travellers, not the real calling of the professional divers, still this fact shows to what a large extent this diving class of fisheries is carried on in Japan.

As to the fresh-water fishing, rod and line, nets and

different kinds of implements are used. Fresh-water fish culture has existed from olden times, and especially that of carp; fresh-water bream, oyster, and gold-fish have also been extensively cultivated. It was only some years ago that the special attention of the government, as well as that of private individuals, was directed to the importance of salmon culture, and that of some other fish; and new scientific methods have been applied to it, and appear to be very successful.

In order to show what pleasure we take in fishing, it will be as well to mention the existence of private fishing ponds, besides river fishery in Tokio. In the suburbs of the capital some private individuals cultivate different kinds of fish in their ponds, and sometimes each pond contains fish differing either in nature or size. Any one is permitted to fish in one of these ponds, on paying entrance fees for the hour or day. I am informed that in some places ponds are classified according to the amount and quality of fish they contain; the entrance fee differs according to this classification. Therefore any one who, however skilful he may be in fishing, hopes by paying a small fee to catch many big fish in one of these ponds is greatly mistaken, because in the inferior ponds only small and worthless fish are kept.

As to the hooks and nets, I may point out that our hooks, both small and large, have a very sharp barb (though some have not, according to the fish to be caught); it is difficult to ascertain when it was invented, but at any rate this would prove our skill in fishing industry to have existed from ancient times. Lines and nets which are made of hemp, or other strong coarse material (and sometimes of silk), are generally varnished with the juice extracted from unripe persimons (fruit called kaki), in order to give them

strength, and the power of resisting water ; English nets are usually tanned. It would be very interesting if, after a careful examination, this stuff should also be made use of in this country for preserving nets and lines ; and on the other hand, if the persimon fruit were condensed by some chemical process, Japan could supply it easily for the use of the British fisheries, and a mutual advantage might be derived from the transaction.

Fish preserved in tin are principally prepared in Hokkaido (Yezo) ; some specimens, such as oiled sardines, preserved oysters and tunny-fish, are exhibited in our Court. This branch of industry, being introduced only a few years ago, may require some improvement in preparation, in order to be more in accordance with European taste ; with such improvements Japan may be able to meet a demand for these articles from abroad.

VI.—FISH COOKERY.

Cookery of fish is almost an art in Japan ; the way of cooking is manifold. It may be divided roughly into several classes :—I. Raw fish, which is subdivided into two ; the first mode is raw fish, properly so-called, that is to say, the flesh of the fish is cut in thin slices and arranged on the plate very neatly in the form of waves, sometimes without taking the skin off the fish, according to its kind, and it is served with sauce (shoyu), mashed raw turnips, horse-radish, and generally some fresh vegetables cut in small pieces and sea-weed. In the second mode it is called *Arar* (washed), because the flesh being cut in small slices, is washed with fresh water till it shrinks and gets harder. Sometimes two or three different sorts of fish of different colours are arranged on the same plate, and divided into

red and white, which gives them a beautiful appearance. 2. Grilled. 3. Stewed. 4. Grilled with sauce. 5. Grilled first and stewed afterwards. 6. Mashed and boiled, prepared like sausages, which has a different name, according to its divers forms and manner of preparation. The inferior kind is made of shark's flesh and that of some other fish ; the most *recherché* is made with bream and lobster.

This general classification may be again subdivided into several modes ; it may even be said that there are as many varieties of fish cooking as there are different kinds of fish ; and it may seem almost inconceivable to the English mind. how neatly, prettily, and with what genius and excellent taste this branch of cookery is conducted in our country. Any one who has been present at a Japanese dinner cannot fail to be struck with the good arrangement with which the different kinds of dishes are prepared ; a dozen dishes, almost all made of fish, are differently cooked and arranged with vegetables and accessories. Sometimes we are puzzled to guess with what sort of fish the dishes are prepared ; and this shows by what ingenious hands they have been composed. The dish most in vogue is composed of eels grilled with sauce. In England eels are cut in small pieces, and generally stewed or fried ; but in Japan they are, while alive, cut into two along the back, but leaving the skin attached, and the bones are taken away, so as to leave skin and flesh, when they are prepared. With what quickness, skill and dexterity this part of their preparation is executed in the eel-houses is almost inconceivable. The man who does this work does no other part of the cooking ; another man prepares them with bamboo skewers for being grilled ; a third man does the next part of the work, and so forth ; there is a real division of labour.

We must not omit to mention that a great quantity of

fish and all kinds of molluscs are used for soup, and very often eaten with vinegar and some greens and sea-weeds. The most essential element of our cookery of either fish or vegetables is the sauce known here under the name of Japanese shoya, properly called *shoyu*, which is extracted from beans and koji ; hard dried fish is also greatly used. This dried fish is cut into small slices and used for the preparation of sauce, or put over shell-fish soured in vinegar. This gives such a flavour to the fresh fish and vegetables that its use becomes almost indispensable to our cookery.

It must not be supposed that fresh fish can be obtained, and consumed with equal facility in every part of Japan ; some tracts being very mountainous, the inhabitants of this region in the remote part of the interior are far from seaports, and generally are a class of peasant farmers, who live on rice or other cereals and vegetables only, being deprived, through the difficulty of transport, of the means of procuring fresh fish. It is true there are railways, but only a few lines connect three chief towns with a few seaports. Fish transport is generally effected by water, and then by carts or men-carriers. In spite of these difficulties of transport, a large amount of fish is consumed generally, because in my opinion, (1) the Japanese seas abound in fish, (2) our fisher folks are very skilful in the fishing industry, (3) the process of drying and salting fish is well conducted, (4) the fish cooking art is so developed that those who can, depend upon fish only. This last case must not be overlooked, because a great demand for fish (besides its cheapness) depends on the taste and liking of the people. In England, fish is often boiled simply, which takes away the best part of its flavour, and with whatever well-prepared sauce it may be taken, it is not so delicious as when prepared otherwise. England, having inexhaustible sea-

fishing ground, with 114,000 active British fishermen, and above all with good transport, is more advantageously placed than Japan, yet the consumption of fish is comparatively small. The chief cause of this (putting aside the dearness of fish and other causes) seems to me, the way of cooking, which it is so desirable to have improved so as to increase the demand of fish consumers, and it would be worth while to try to study the Japanese fish-cooking art, in order to adopt it in this country.

As to the case of Japan, a great many improvements in fish-culture, industry, and for the easier transport of fish may be required. When the great line of railway from the capital to the north, which is in the course of construction by a Japanese Company, is completed, it will, I am sure, give more facility for the transport of the sea-products of Yeso, and increase its fishing industry in no small degree. In conclusion, the best means to improve national fish-industry is by the way of exchanging different views and information through the channel afforded by the International Fisheries Exhibition, which will doubtless be for the benefit of every party interested in this branch of national and international wealth.

DISCUSSION.

Mr. WILMOT (Commissioner for Canada) moved a vote of thanks to Mr. Okoshi, for the very lucid and interesting Paper he had read, and which he was sure, when printed and circulated, would prove of very great benefit. It taught him, who lived at the antipodes almost of Japan, that they there had their ideas in regard to preserving, cooking, and utilising fish quite beyond the conception of

Canada, or even England. The multitude of fish which were taken in the Japanese waters appeared to be very great, the population was very great, and consequently they wished to utilise fish in every way. He was somewhat amused to hear that they consumed the devil-fish, or cuttle-fish, which he was sure the people in this country or Canada would not think of touching. It was evident, however, that it was an article of food, and showed him that almost every description of animal extant in the waters was intended for the food of man, and it was only on account of prejudice that some kinds were not eaten. He had no doubt the time would come when it would be used elsewhere, especially after it was shown in this Paper that it was a useful food. Another thing which struck him was that the females in Japan engaged in fishing operations ; in this country when they went to the bathing ground in their bright-coloured dresses, it was more for the purpose of becoming fishers of men. If the Japanese custom were introduced here, no doubt many more fish would be taken.

Mr. J. B. BLOOMFIELD seconded the vote of thanks. He said that he unfortunately was an Irishman, and as such had a very doleful tale to tell when he came to think of the difference of civilisation between Japan and Ireland. This Paper said that in Japan the most was made already of one of the greatest gifts God had ever given to man, the great harvest of the sea, which took very little trouble on the part of either rulers or people to make the most of ; but in his unfortunate country they had at present over 2500 miles of unfished coast, and about 527,000 acres of inland waters which did not contribute, except the salmonidæ, a five-pound note in value to the national food. It appeared that the Japanese were so determined to get the fish, that they took the female sex into partnership in their efforts ; but in

Ireland many poor women during a great portion of last winter had to obtain sustenance for themselves and families from a kind of seaweed called dilex, which they found upon the rocks. He trusted that this glorious Exhibition, which had, by the friction of intellect, struck that spark which swept away many prejudices, would in the end bring all things to one common level of humanity throughout the world, and would then bring to his poor country some of the knowledge and some of the good results which must happen if only the present state of things in Japan was fairly considered. Many years ago, when he was in the Chinese seas, at the time England was guarded by wooden walls, it happened that a seventy-four ship was greatly infested with rats, and a grand rat-catching business took place, the rats were thrown overboard; but there was not a small boat within reach that did not cast off their anchors, and in a very short time the rats were devoured. Thousands of these Chinamen were now scattered all over the earth, so many were coming to some places that the law was stopping them. At that time he had never seen the Japanese; but in a very short time afterwards they saw that there was a necessity for them to learn of Western Europe, and at the same time it turned out that they had conferred great benefits upon Europe in their turn.

The vote of thanks was carried unanimously, and briefly acknowledged by Mr. OKOSHI.

Mr. STUART LANE then moved a vote of thanks to the Chairman. He himself had had great personal relations with Japan, which made the country familiar and interesting to him, and he could assure them all that the more they studied it the more they would learn to admire it. There was great similarity between Japan and Great Britain, both countries being nearly in the same latitude,

and having about the same acreage and population, and each country might learn a great deal from the other. The pleasure they had all experienced in listening to the lecturer must be one greatly enhanced by the fact of the meeting being presided over by a Japanese ; probably it was the first time such a thing had happened, but he was sure it would not be the last, for when once the Japanese took a thing in hand they never left it until they made it successful. He had had the honour of knowing both the Chairman and the lecturer for some considerable time, but he might say that when he met the latter, four or five years ago, on his arrival from Japan, he could not speak one word of English.

Mr. BEADON seconded the vote of thanks, which was carried unanimously.

The CHAIRMAN, in responding, said they were all aware that Japan had adopted many branches of Western civilisation in addition to her own, which had existed for centuries, and that she had made of recent years very great progress. Since the present Government came to power it had been their earnest desire to promote, amongst other things, friendship with foreign nations, and with this object they had accredited their ambassadors and other diplomatic representatives to the various courts of the world ; and when there was any undertaking of an international character, such as the present Exhibition, whether in Europe or in America, they never failed to take an active part in it. It was a source of great satisfaction to them that the courtesy and respect they had thus shown to foreign nations had been cordially reciprocated, and that they had received assurances of friendship in return ; but there was one serious obstacle which had tended to check this friendship—he alluded to the great delay which had taken place in the negotiations for a

revision of the treaties proposed by Japan some years ago. Those treaties were concluded between Japan and the foreign countries some twenty-five or thirty years ago under considerable external pressure, and when the Japanese negotiators were totally ignorant of the commercial and other usages of Western countries. Treaties concluded under such circumstances naturally lacked that equitable character which was at all times so essential in any arrangement entered into between friendly powers. Japan in 1883 was very different to what she was thirty years ago, and the experience of thirty years amply showed that it was absolutely necessary to introduce certain modifications in the existing treaty arrangements. Those he was addressing might not attach much importance to this question, as it concerned a country so far distant, and no one not so thoroughly acquainted as he was with the general condition of Japan could properly estimate the serious difficulty occasioned by this disastrous delay in connection with the national finances and the attitude of the people towards foreigners. He sincerely hoped that the good feelings of the Western powers would induce them to recognise not only the necessity, but also the advantage of speedily bringing about a satisfactory conclusion of this question. In conclusion, he must say he regretted that Japan had not been able to take a more lively part in this Exhibition, but it so happened that they had a National Fisheries Exhibition in Japan this year, and naturally the Government had to give considerable attention and assistance to that, which had prevented their sending a larger quantity of specimens to England. Japan, as a great fish-eating country, had naturally done her utmost to develop the fishing industry, and he should not be exaggerating when he said that it had attained such an extent that

36,000,000 of people were to-day more or less dependent on fish as food ; and had it not been for the coincident Exhibition held in Tokio, she would have been represented in the same grand manner as she had on previous occasions of a similar international character. At all events Japan had readily come forward to take part in this Exhibition, and had thus fulfilled her international obligations, at the same time showing her usual courtesy and respect to the British Government and British public.

APPENDIX A.

“93, TALBOT ROAD, BAYSWATER, W.,

“20th August, 1883.

“DEAR SIR,—In accordance with your request, I have much pleasure in furnishing you with a few notes on ‘Toami’ (throwing-net), embracing a description of its mode of use, and an account of its construction.

“I also enclose herein a short Paper on ‘Ahyu’ and ‘Namako,’ fish which are much esteemed in our country.

“I beg to express the hope that these communications may be, in some way, serviceable to your purpose.

“I am, Sir,

“Yours faithfully,

“K. NABESHIMA.

“N. OKOSHI, Esq.

“Japanese Consulate,

“London, E.C.”

“TOAMI.”

(THROWING-NET).

Among the many kinds of fishing appliances in Japan, the one called “Toami” is probably the most novel to Europeans, and at the same time, the most interesting to the Japanese.

“Toami,” as above translated, is a throwing-net, and its structure may be thus described.

The net and size of its mesh varies in magnitude, according to the size and nature of the fish to be caught, and the locality

where it may be used. Its length varies from 5 to 7 yards, and it is conical in shape, becoming larger and larger from the apex downwards to the foot; where, when fully extended, it measures from 7 to 9 yards in diameter.

To the top of this cone-shaped net is tied a "hand rope," about 6 or 8 yards, having at the other end a loop.

At the foot of the net is attached all round the extremity, a strong "foot-rope," or "ground-rope," to which numerous metal weights, as sinkers, of peculiar shape, named "iwa," are fastened.

These sinkers are made of a mixture of lead and tin. In shape they resemble the handle of an ordinary travelling trunk, having a hole at each end, through which the "foot-rope" is passed at intervals equal to their own length, generally from $2\frac{1}{2}$ to 3 inches.

The edge of the foot of the net is then doubled or folded inwards upon itself—on the side opposite to that of the rope tied to the apex of the cone—to the extent of about one-tenth of the length, and is then fastened to the meshes all round, at intervals of from 20 to 30 meshes, according to the size of the net.

The effect of this is to make a kind of continuous sack or bag termed "Tana" all round the inside of the net. The *modus operandi* may be described as follows:—

The fisherman standing up in the bow of his boat first makes a running knot with the loop, which he secures round his left wrist.

With his right hand he then coils the rope into his left, until the upper portion of the net is drawn into his grasp, leaving about a yard or more hanging down. He then passes a part of the latter over the left elbow, maintaining it there by keeping his arm at right angles to his side, and so allowing the net to swing in a pendent form.

Then, gathering into the grasp of the right hand about half of the remainder, he swings the whole to and fro, to give it impetus, and dexterously throws it some 8 or 10 yards in front of his boat, in such a manner that it is extended into a complete circle when it falls into the water, where it quickly sinks in its regular cone-like shape to the bottom.

After it has remained there a few seconds, the line is pulled

gently in different directions, so that the weighted portions trail along the ground and approach each other, until the net is gradually and finally closed (great care being observed that no outlet of escape is afforded between the ground and the sinkers). The fish which may be enveloped in the toils endeavour to escape, and as openings of the "Tana" appear to them to be loopholes for this purpose, they eagerly enter them, and are effectually confined. The net is then drawn up slowly from the ground, until it hangs perpendicularly: and as the sinkers now almost cling together, all egress from the sack is thoroughly barred. The fisherman gradually hauls it up, and as the "Tana" begins to approach the surface, he rapidly but gently swings it with its piscine contents into the boat.

The method of constructing this net presents some difficulty, as it must be cone-shaped. The knot which unites the meshes is not the "hitch-knot" which is prevalent in Europe, but the "reef-knot," which is particularly suited to nets of this description.

The process of netting is generally commenced from the lower part, or the "foot" of the net. The number of meshes in the first row varies from about four hundred to seven or eight hundred, and the size of each mesh varies inversely to its number. The greater the size of mesh, the less its number, and *vice versa*. For instance, to construct the "Toami" for catching mullet, suppose the number of meshes in the first row to be 400, and the size of each mesh to be $1\frac{1}{2}$ inch square (using a flat spool of $1\frac{1}{2}$ inch in width); well then, this row of 400 meshes must be continued successively 25 times; the 26th row must be lessened by 16 meshes, by attaching two meshes together at the intervals of every 25 meshes in that row.

Now there will remain 384 meshes, which, being netted again successively 15 times, must again be decreased by 19, by attaching 2 meshes together as before, at the intervals of every 20 meshes in that row. This process will be best shown in the following scheme.

THE SCHEME OF CALCULATION.

Part.	Number of Meshes.	Decrease of Meshes.	Number of Rows.	Size of Flat Spool.	Feet.	Inches.
1	400	16	25	1½	3	1½
2	384	19	15	„	1	10½
3	365	18	10	„	1	3
4	347	17	10	„	1	3
5	330	16	8	„	1	0
6	314	17	8	„	1	0
7	297	16	8	„	1	0
8	281	15	8	„	1	0
9	266	16	7	„	..	10½
10	250	17	6	„	..	9
11	233	16	6	„	..	9
12	217	16	6	„	..	9
13	201	16	5	„	..	7½
14	185	16	4	„	..	6
15	169	16	4	„	..	6
16	153	19	4	„	..	6
17	134	22	3	„	..	4½
18	112	19	3	„	..	4½
19	93	23	3	„	..	4½
20	70	23	2	„	..	3
21	47	15	2	„	..	3
22	32	2	2	„	..	3
23	30	..	1	„	..	1½
Total .	..	..	152	..	10	0

Nets in Japan are dipped in shibu (the juice of unripe persimon fruit). In my humble opinion they are by this process rendered, for several reasons, far superior to those which in Europe are subjected to that of tanning. For instance, the treatment with shibu produces a greater amount of stiffness in nets and prevents

their tendency to swell when in the water, thereby ensuring a great rapidity of sinking. Moreover, as a preservative from decay and the bad effect of salt-water, this treatment is invaluable.

“AHYU.”

The fish called “Ahyu” possesses some very peculiar characteristics. It varies in size from about 6 to 12 inches, and inhabits fresh and rapid streams, having a nature like that of the salmon in making its way up to the highest sources of the rivers in the spring, and betaking itself in the autumn to the estuaries to spawn. Strange to say, the parent fish, after depositing its ova, disappears, most probably dying. Hence it is sometimes called the “one-year-fish.” When taken from the water, it does not at all emit a fish-like odour, but a smell remarkably resembling that of the cucumber. It is not tenacious of life when taken out of water; indeed, the slightest handling is immediately fatal to it. Its flesh is held in the highest estimation, and is considered the most delicately flavoured of all river fish. Its scales are almost invisible, and the body resembles the European smelt. Its lips are somewhat thick, being either golden or silver in hue, those of the former colour being most esteemed. It rapidly deteriorates in flavour, and cannot be conveyed far in a fresh and proper state. Hence it is somewhat expensive.

Three modes of taking “Ahyu” are in vogue, which we may thus specify:

Firstly: the “Toami” or “Throwing-net” (as above described) is most successfully practised.

Secondly: cormorants are used. This plan is too well known to need any explanation.

Thirdly: the fish are captured in a species of trap, termed “Yana,” during the autumn, when they are migrating downwards in large numbers to the estuaries for spawning. This method will need some elucidation.

At a convenient place the river is dammed by two structures composed of fascines and stones, running from the banks at opposite points towards the middle, at an obtuse angle down the



stream, without meeting, but leaving a space of 4 to 5 yards, through which the current is forced to run at a high speed. In this narrow passage is fixed a contrivance composed of a large number of bamboos, not bound together quite closely, but connected so as to fill this narrow space, diagonally tilted downward towards the stream in such a manner that, while it receives the rapid fall of water, it, at the same time, detains the fish, the water escaping through the interstices between the bamboos, which, however, are not large enough to allow the fish to pass through. In this manner enormous quantities are caught during the season.

"NAMAKO."

(BÊCHE DE MER).

Namako, in the French language termed "Bêche de mer," somewhat resembles in shape the half of a melon cut lengthwise. It is styled in the reports of the Japanese Customs "Kinko"—the name given to it when dried—and is exported to some foreign countries. Its colour is greenish-gray, dotted with raised spots of light yellow, which colour also pervades underneath, where it attaches itself to the rocks or stones. It is eyeless, and boneless, its digestive organs being very small. It is found on various parts of the coasts, and is much sought for as an article of food. Its usual size, when quiescent and not extended, is 6 to 12 inches in length, its general breadth being about 2 to 4 inches. It is capable of elongating and contracting itself at pleasure. To ensure the capture of "Namako," calm weather and clear water are essential, so that the fisherman, as he slowly and quietly paddles here and there, may discern the object of his search at the bottom. Armed with a long bamboo rod from 18 to 24 feet long, which is tipped at the extremity with an iron-barbed spear-head, he leans over the gunwale of his boat, closely peering and prying down into the clear water with keen and practised eye. When he discovers the fish, he proceeds forthwith to spear and secure it. To assist his power of vision, he adopts a peculiar expedient. He has, in the boat, a tiny vessel containing oil, from which he takes, from time to time, a small quantity, and drops it

on the surface of the sea. This arrangement enables him to see the bottom so clearly, that he has little difficulty in spying down with success, even when the water is somewhat deep. The fish is generally eaten uncooked, cut into thin slices, with vinegar. In a dry and prepared state it is conveyed into the interior or is exported.

This fish has an excessively strong antipathy to rice-straw, so much so that the fish actually dissolves into a liquid if it should come in close proximity to it, just as a piece of ice melts under the influence of the sun. Sometimes disagreeable effects are produced by too free an indulgence in partaking of "Namako," and to counteract these symptoms the liquor in which some rice-straw has been boiled proves an effectual antidote.

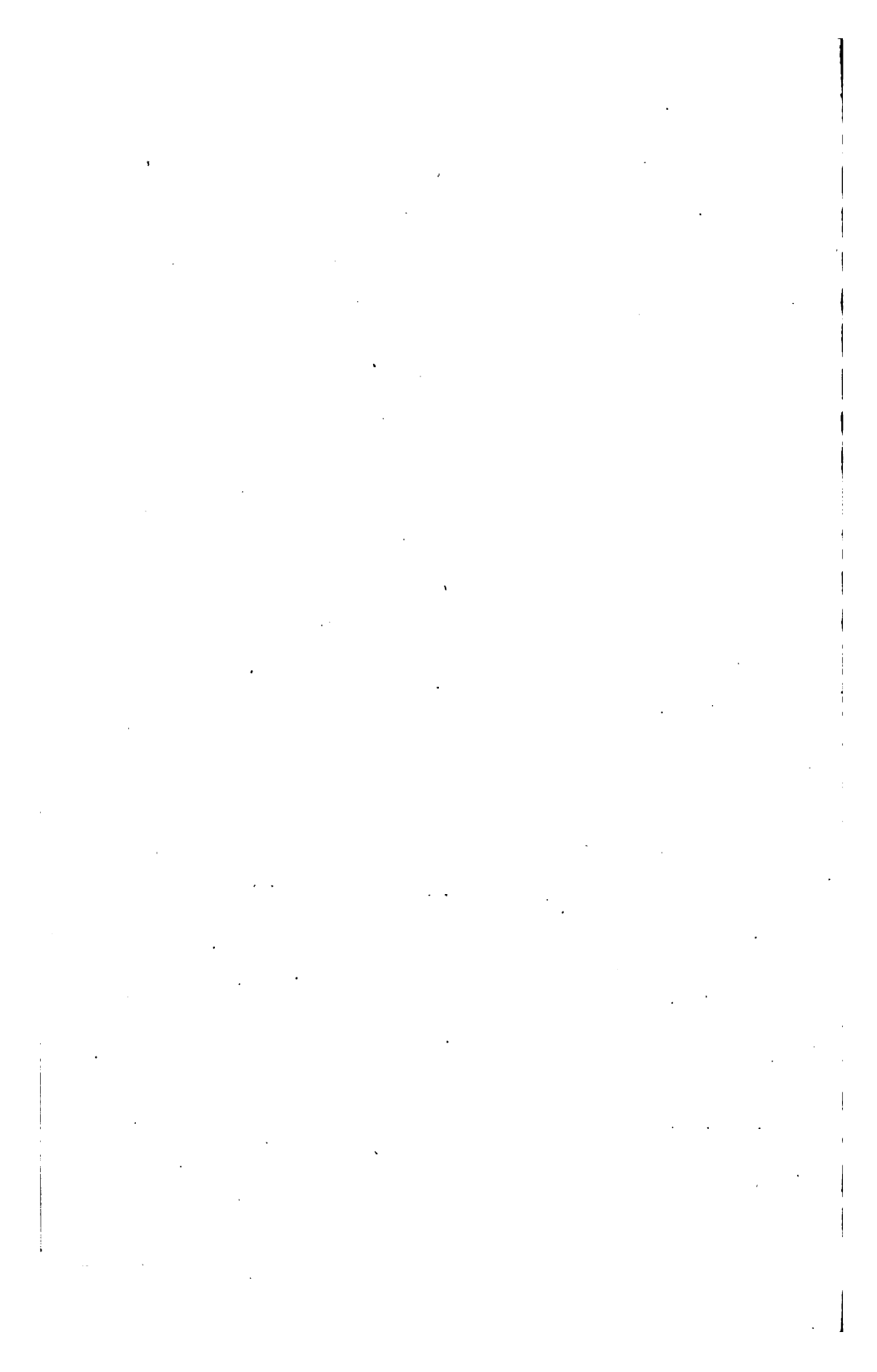
APPENDIX B.

TABLE SHOWING THE AMOUNT OF SEA-PRODUCE OF EACH PROVINCE OF THE JAPANESE EMPIRE FOR THE YEAR 1881.

Name of the Provinces.	Salt.	Katsu Bushi, or Hard Dried Fish.	Dried Fish.	Dried Sardines.	Dried Sea- ear.	Dried Shrimps.	Cuttle-fish.	Bêche de mer.	Colle Végétale.
Izumi	..	..	224,759	15,000	..	..	..	..	..
Isé	2,338,864	71,344	84,127	498,500	..	281	285	2,490	15,710
Shima	..	56,710	561,920	3,244	3,010	91,324	..	170,179	521,862
Owari	419,663	..	8,605	..	..	20,790	..	8,888	..
Mikawa	14,207,038	..	323,625	2,265,152	..	1,123	..	3,984	..
Totomi	1,678,661	231,845	8,800	1,271,975	1,000	4,100	..	..	..
Suruga	1,222,322	43,353	80,046	13,750	492	..	..	..	..
Izu	..	135,516	335,720	5,320	639	..	28,360	..	491,950
Sagami	88,313	..	316,930	..	..	..	..	..	..
Musashi	1,068,503	..	..	..	..	..	..	..	..
Awa	..	79,538	5,260,400	2,253,506	54,970	..	..	..	151,098
Kazusa	304,808	73,358	1,712,075	20,083,586	105,955	..	..	..	312,010
Shimosa	8,778,663	38,125	..	4,079,943	..	7,831	..	..	..
Hitachi	349,682	75,832	173,796	6,970,844	8,000	208,688	..	..	450
Omi	..	..	..	..	..	1,250	..	..	..
Shinano	..	..	..	..	..	4,958	..	..	..
Iwaki	4,586,977	108,365	144,000	331,261	14,140	50	..	..	..
Rikusen	15,597,394	538,380	89,840	5,141	99,981	..	128,372	29,956	430
Rikuchiu	5,743,578	23,307	86,397	4,000	52,437	..	89,688	1,500	4,270
Mutsu	..	..	..	..	49,627	..	28,211	4,354	..
Ouzen	..	..	..	32,600	..	..	..	..	263
Ougo	395,587	..	..	720,417	..	..	..	..	10,018
Wakasa	109,977	10,563	248,413	304,638	25,800	..	15,363	6,386	150
Echizen	565,201	..	49,688	10,938	..	12,063	45,850	395	5,317
Kaga	846,688	..	440,117	..	..	..	1,200	..	..
Noto	34,158,135	..	228,775	..	12,125	..	121,525	19,113	6,320
Echiiu	..	..	1,122,645	..	..	..	45,960	..	4,050

Echigo	662,128	400	2,071,883	2,619,706	2,986	19,350	8,240	..	..
Sado	164,883	50	194,864	49,929	5,636	130	..	876	..
Tango	327,615	..	307,945	22,887	..	..	1,281	1,630	..
Inaba	69,023	..	..	17,100	..	..	659,400	..	6,655
Hoki	..	..	..	17,100	..	..	..	..	..
Izumo	2,909	75	210,893	48,661	..	23,225	4,258	82	3,691
Iwami	..	..	60,691	994,852	2,831	..	17,886	2,751	2,082
Sanuki	..	..	..	338,000	5,466	..	248,117	..	802
Harima	182,798,139	..	..	..	..	81,260	..	3,880	..
Bize	65,694,628	..	412	..	..	..	..	..	..
Bichin	6,393,294	..	500	..	..	2,431,865	..	..	..
Bingo	42,932,810	..	161,350	..	..	334,000	..	4,568	..
Aki	71,748,077	..	96,753	4,869	..	318	3,152	8,618	..
Suō	118,994,727	..	..	674,481	..	55	41,608	2,935	694
Nagato	19,066,579	..	..	142,420	10,495	..	8,248	..	237,100
Kii	1,190,756	503,190	3,131,842	6,560	80	..	..	555	..
Awa	38,880,313	77,591	..	..	..	..	..	2,205	..
Sanuki	106,662,071	..	19,901	60,000	..	..	..	43,760	56,832
Iyo	54,725,980	10,445	79,998	12,623,710	4,160	12,734	55,266	53	43,129
Tossa	3,055,381	1,536,984	..	258,425	13,045	..	19,733	125	1,694
Tikuzen	10,237,004	..	8,800	55,900	2,720	..	7,390	945	..
Buzen	7,129,972	..	2,250	13,500	..	12,720	..	1,019	..
Bungo	10,868,854	30,400	2,658,271	8,398,589	2,530	400	43,543	17,558	24,643
Hizen	7,112,175	374,239	131,005	3,369,487	20,601	30,700	299,104	..	..
Higo	56,195,827	27,000	..	320,000	1,900	74,384	50,110	..	..
Hi-ouga	547,591	189,481	2,128,500	394,495	80	..	850	..	2,255
Osumi	5,576,930	25,350	9,600	38,800	..	400	1,890	..	2,952
Satsuma	6,413,913	287,956	9,788	120,445	10	..	23,380	..	47,384
Iki	..	..	..	44,200	10,520	..	145,500	4,070	436
Tsushima	..	1,025	89,370	55,240	2,011	..	72,431	2,816	3,811
Hakodaté—Ken	..	..	28,134,803	32,563,154	63,499	..	239,190	27,226	..
Sapporo—Ken	..	..	29,550,856	85,404,446	399,918	..	3,395	143,301	..
Nemuro—Ken	..	..	..	7,146,549	..	..	..	5,568	..
Total City or Kin	910,331,833	4,550,422	80,561,944	194,657,489	976,684	3,373,999	2,458,586	522,066	1,699,058

N.B.—In case of three provinces of Yezo, viz.: Hakodaté, Sapporo, and Nemuro, dried fish means Herrings, and under the head of Dried Sardines, Dried Herrings are included—a City or Kin is equal to 1'32377 lbs. English.



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